Name:

at1119paper: Complete the Square, b = odd (v512)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 61x = -624$$

Add $\left(\frac{-61}{2}\right)^2$, which equals $\frac{3721}{4}$, to both sides of the equation.

$$x^2 - 61x + \frac{3721}{4} = \frac{1225}{4}$$

Factor the left side.

$$\left(x + \frac{-61}{2}\right)^2 = \frac{1225}{4}$$

Undo the squaring.

$$\begin{array}{rcl} x + \frac{-61}{2} = \frac{-35}{2} & \text{or} & x + \frac{-61}{2} = \frac{35}{2} \\ x = \frac{61 - 35}{2} & \text{or} & x = \frac{61 + 35}{2} \\ x = 13 & \text{or} & x = 48 \end{array}$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 - 31x = 1242$$

$$x^2 - 31x + \frac{961}{4} = \frac{5929}{4}$$

$$\left(x + \frac{-31}{2}\right)^2 = \frac{5929}{4}$$

$$\begin{array}{rcl} x + \frac{-31}{2} = \frac{-77}{2} & \text{or} & x + \frac{-31}{2} = \frac{77}{2} \\ x = \frac{31 - 77}{2} & \text{or} & x = \frac{31 + 77}{2} \\ x = -23 & \text{or} & x = 54 \end{array}$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 25x = -84$$

$$x^2 - 25x + \frac{625}{4} = \frac{289}{4}$$

$$\left(x + \frac{-25}{2}\right)^2 = \frac{289}{4}$$

$$x + \frac{-25}{2} = \frac{-17}{2} \quad \text{or} \quad x + \frac{-25}{2} = \frac{17}{2}$$

$$x = \frac{25 - 17}{2} \quad \text{or} \quad x = \frac{25 + 17}{2}$$

$$x = 4 \quad \text{or} \quad x = 21$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 - 57x = -630$$

$$x^2 - 57x + \frac{3249}{4} = \frac{729}{4}$$

$$\left(x + \frac{-57}{2}\right)^2 = \frac{729}{4}$$

$$x + \frac{-57}{2} = \frac{-27}{2} \quad \text{or} \quad x + \frac{-57}{2} = \frac{27}{2}$$

$$x = \frac{57 - 27}{2} \quad \text{or} \quad x = \frac{57 + 27}{2}$$

$$x = 15 \quad \text{or} \quad x = 42$$